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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/386,052	08/30/1999	YASUO OKUTANI	1232-4563	9961

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MICHAEL M MURRAY
MORGAN & FINNEGAN LLP
345 PARK AVENUE
NEW YORK, NY 10154

EXAMINER

ARMSTRONG, ANGELA A

ART UNIT PAPER NUMBER

2654

DATE MAILED: 02/09/2004

24

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/386,052

Applicant(s)

OKUTANI ET AL.

Examiner

Angela A. Armstrong

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-17 and 19-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-6,8-17 and 19-24 is/are allowed.
- 6) ☒ Claim(s) 25-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 20, 2003 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 28-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campbell et al. (GB 2,313,530), hereinafter referred to as Campbell, in view of Itoh (US Patent No. 5,740,320).
3. Regarding claims 28, 30 and 32, Campbell discloses a speech synthesizer which implements generating feature vectors or feature parameters for respective phonemes in which acoustic feature vectors, phoneme label and start time of phonemes within a speech waveform database, speech fundamental frequency, phoneme durations and a power value are stored as

essential information at Figure 1, element 30; page 15, lines 21-26, which reads on “storing plural items of phoneme data.”

Additionally, Campbell teaches selection of feature parameters at page 25, line 10 continuing to page 26, line 17, which reads on “retrieving phoneme data having identical phoneme environments and fundamental frequencies from the plural items of phoneme data stored.”

Campbell implements a speech unit selector that generates index information based on feature vectors and weight vectors of the phonemes that is output to the speech synthesizer at Figure 1, element 12 and page 40, line 22 continuing to page 43, line 21, which reads on “selecting phoneme data to be employed in synthesis of a speech waveform.”

Campbell also teaches a weighting coefficient process for assigning a weighting coefficient vector to target phonemes based on degrees of contribution (page 38, line 9 continuing to page 40, line 21), which reads on “assigning a penalty that is based on an attribute value” and teaches a selector which searches for a combination of phoneme candidates which correspond to a phoneme sequence of an input sequence (Abstract), wherein the system searches for a combination of phoneme candidates that minimize the cost including a target cost representing approximate costs (or differences) between target phonemes and phoneme candidates (page 12, lines 3-10; page 28, line 3 continuing to page 30, line 6) and selects samples closet to desired speech through processing performed given sets of phoneme labels, fundamental frequency and/or duration “assigning a penalty so as to raise the possibility that phoneme data whose value of a predetermined attribute is close the value of the predetermined attribute.”

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Campbell does not specifically teach that the value of the predetermined attribute is an average value.

Itoh teaches a text-to-speech catenation/synthesis-by-rule system which clusters phonemic waveforms of a natural speech segment and selects a phonemic waveform that is nearest the centroid of LPC parameters of all the waveforms of the cluster (col. 5, line 19 continuing to col. 6, line 7). Itoh teaches that selection of phonemic waveforms closest to the centroid results in synthetic speech that is natural and smooth (col. 3, lines 51-60).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the speech synthesis system of Campbell and compare the phoneme candidates with an average value of the target phonemes, as suggested by Itoh, such that the selected phonemes will generate natural and smooth synthetic speech, as taught by Itoh.

4. Regarding claims 29 and 31, Campbell also teaches a weighting coefficient process for assigning a weighting coefficient vector to target phonemes based on degrees of contribution (page 38, line 9 continuing to page 40, line 21), which reads on “assigning a penalty that is based on an attribute value” and teaches a selector which searches for a combination of phoneme candidates which correspond to a phoneme sequence of an input sequence (Abstract), wherein the system searches for a combination of phoneme candidates that minimize the cost including a target cost representing approximate costs (or differences) between target phonemes and phoneme candidates (page 12, lines 3-10; page 28, line 3 continuing to page 30, line 6) and selects samples closet to desired speech through processing performed given sets of phoneme labels, fundamental frequency and/or duration “assigning a penalty so as to raise the possibility

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that phoneme data whose value of a predetermined attribute is close the value of the predetermined attribute.”

Campbell does not specifically teach that the value of the predetermined attribute is an average value.

Itoh teaches a text-to-speech catenation/synthesis-by-rule system which clusters phonemic waveforms of a natural speech segment and selects a phonemic waveform that is nearest the centroid of LPC parameters of all the waveforms of the cluster (col. 5, line 19 continuing to col. 6, line 7). Itoh teaches that selection of phonemic waveforms closest to the centroid results in synthetic speech that is natural and smooth (col. 3, lines 51-60).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the speech synthesis system of Campbell and compare the phoneme candidates with an average value of the target phonemes, as suggested by Itoh, such that the selected phonemes will generate natural and smooth synthetic speech, as taught by Itoh.

5. Claims 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Campbell et al. (GB 2,313,530), hereinafter referred to as Campbell, in view of Moebius et al (US Patent No. 5,751,907) and further in view of Itoh (US Patent No. 5,740,320).

6. Regarding claims 25-27, Campbell discloses a speech synthesizer which implements generating feature vectors or feature parameters for respective phonemes in which acoustic feature vectors, phoneme label and start time of phonemes within a speech waveform database, speech fundamental frequency, phoneme durations and a power value are stored as essential information at Figure 1, element 30; page 15, lines 21-26, which reads on “storage means for

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storing plural items of phoneme data, wherein each item of phoneme data includes an attribute value for phoneme environment, phoneme boundary and fundamental frequency, power and phoneme duration.”

Additionally, Campbell teaches selection of feature parameters at page 25, line 10 continuing to page 26, line 17, which reads on “retrieving phoneme data having identical phoneme environments and fundamental frequencies from the plural items of phoneme data stored.”

Campbell implements a speech unit selector that generates index information based on feature vectors and weight vectors of the phonemes that is output to the speech synthesizer at Figure 1, element 12 and page 40, line 22 continuing to page 43, line 21, which reads on “selecting phoneme data to be employed in synthesis of a speech waveform.”

Campbell also teaches a weighting coefficient process for assigning a weighting coefficient vector to target phonemes based on degrees of contribution (page 38, line 9 continuing to page 40, line 21), which reads on “assigning a penalty that is based on an attribute value” and teaches a selector which searches for a combination of phoneme candidates which correspond to a phoneme sequence of an input sequence (Abstract), wherein the system searches for a combination of phoneme candidates that minimize the cost including a target cost representing approximate costs (or differences) between target phonemes and phoneme candidates (page 12, lines 3-10; page 28, line 3 continuing to page 30, line 6) and selects samples closet to desired speech through processing performed given sets of phoneme labels, fundamental frequency and/or duration “assigning a penalty so as to raise the possibility that

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phoneme data whose value of a predetermined attribute is close the value of the predetermined attribute.”

Campbell et al. do not specifically teach penalty assigning which sorts retrieved phoneme data based upon a prescribed attribute value and assigns a penalty value on the basis of the sorting order. In a similar field of endeavor, Moebius et al discloses a speech synthesizer having an acoustic element database, which concatenates the acoustic elements having common junction phonemes such that perceptible discontinuities at the junction phonemes are minimized (abstract). The method for selecting a phonetic sequence used for forming the acoustic elements used in the concatenation is accomplished by assigning a value to each of the phonetic sequences based on a particular quality measure to rank the sequences with regard to the corresponding boundary phonemes (col. 9, line 33 continuing to col. 10, line 6), which reads on “sorting retrieved phoneme data based upon a prescribed attribute value and for assigning a penalty that is based on an attribute value.”

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the speech synthesis system of Campbell to implement assigning a value to the phoneme data based on a quality measure to rank the phoneme data based on corresponding boundary phonemes, as taught by Moebius, for the purpose of selecting phoneme data for formation of acoustic elements that achieve a reduction in concatenation discontinuities.

Campbell and Moebius do not specifically teach that the value of the predetermined attribute is an average value.

Itoh teaches a text-to-speech catenation/synthesis-by-rule system which clusters phonemic waveforms of a natural speech segment and selects a phonemic waveform that is

nearest the centroid of LPC parameters of all the waveforms of the cluster (col. 5, line 19 continuing to col. 6, line 7). Itoh teaches that selection of phonemic waveforms closest to the centroid results in synthetic speech that is natural and smooth (col. 3, lines 51-60).

Therefore, it would have been obvious to one of ordinary skill at the time of the invention to modify the speech synthesis system of Campbell and Moebius and compare the phoneme candidates with an average value of the target phonemes, as suggested by Itoh, such that the selected phonemes will generate natural and smooth synthetic speech, as taught by Itoh.

Response to Arguments

7. Applicant's arguments with respect to claims 25-32 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

8. Claims 1-6, 8-17, and 19-24 are allowed.

9. The following is a statement of reasons for the indication of allowable subject matter:

10. Regarding claims 1-6, 8, 12-17, 19, and 23, the prior art of record does not specifically teach or disclose a penalty assigning means which assigns a power-related penalty in such a manner that a small penalty is assigned to phoneme data whose power is close to an average value of the power, and assigns a phoneme-duration-related penalty in such a manner that a small penalty is assigned to phoneme data whose phoneme duration is close to an average value of the phoneme duration.

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Regarding claims 9-11, 20-22, and 24, the prior art of record does not specifically teach or disclose a counting means for grouping phoneme data on the basis of a phoneme environment, and counting the items of phoneme data on a per group basis and a second penalty assigning means for assigning a penalty on the basis of a count obtained by the counting means to the phoneme data retrieved by an alternate retrieval means, the second penalty being assigned in addition to a penalty assigned by a first penalty means.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela A. Armstrong whose telephone number is 703-308-6258. The examiner can normally be reached on Monday-Thursday 7:30-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (703) 305-9645. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Angela A. Armstrong
Examiner
Art Unit 2654

AAA
February 4, 2004

